Stainless steel earth rod (304L and 316 stainless steel)



The KALOT Group stainless steel earth rod is a solid earth electrode made of austenitic stainless steel. Our main grade is 304L, and for highly corrosive environments or on customer request we also manufacture grade 316. Stainless steel is hard and drives well, and it is a common, well-suited alternative to copper electrodes next to buried pipes, tanks and steel structures and in installations with cathodic protection.

- 304L stainless steel; grade 316 for highly corrosive environments
- 16 and 20 mm diameter; 1500 and 2000 mm long; M10 thread
- Pointed first earth rod, extension earth rod with integral dowel
- Less effect than copper on buried steel structures

Technical specifications

Product type	Solid stainless steel earth rod (earth electrode), two-length
Material	Austenitic stainless steel 304L; for highly corrosive environments or on request, 316
Diameter D	16 and 20 mm
Thread	M10 on both diameters; internal thread depth and integral dowel length 20 mm
First earth rod	pointed, tip length 20 mm; internal thread M10 20 mm deep at the top end
Extension earth rod	integral dowel M10 20 mm long at the bottom end; top end plain and chamfered
Length of each section	1500 and 2000 mm
Electrode depth	First earth rod and extension earth rod together: 3, 3.5 or 4 m
Weight of a 1500 length (304L)	2.36 kg (16 diameter) and 3.70 kg (20 diameter)
Driving tools	Threaded driving head for the first earth rod; the extension earth rod is driven directly, and a hollow driving cap in hardened steel is supplied on request
Design basis	grade 316 based on the requirements of IEC 62561-2
Order code	SSER 1615, SSER 1620, SSER 2015 and SSER 2020 with suffix S (starter earth rod) or E (extension earth rod); for 316, suffix -316

Models, order codes and weight

Order code	Type	Diameter D (mm)	Thread	Length L (mm)	304L weight (kg)	316 weight (kg)
SSER 1615 S	First earth rod	16	M10	1500	2.36	2.38
SSER 1615 E	Extension earth rod	16	M10	1500	2.37	2.39
SSER 1620 S	First earth rod	16	M10	2000	3.16	3.18
SSER 1620 E	Extension earth rod	16	M10	2000	3.17	3.19
SSER 2015 S	First earth rod	20	M10	1500	3.70	3.72
SSER 2015 E	Extension earth rod	20	M10	1500	3.70	3.72
SSER 2020 S	First earth rod	20	M10	2000	4.94	4.97
SSER 2020 E	Extension earth rod	20	M10	2000	4.94	4.97

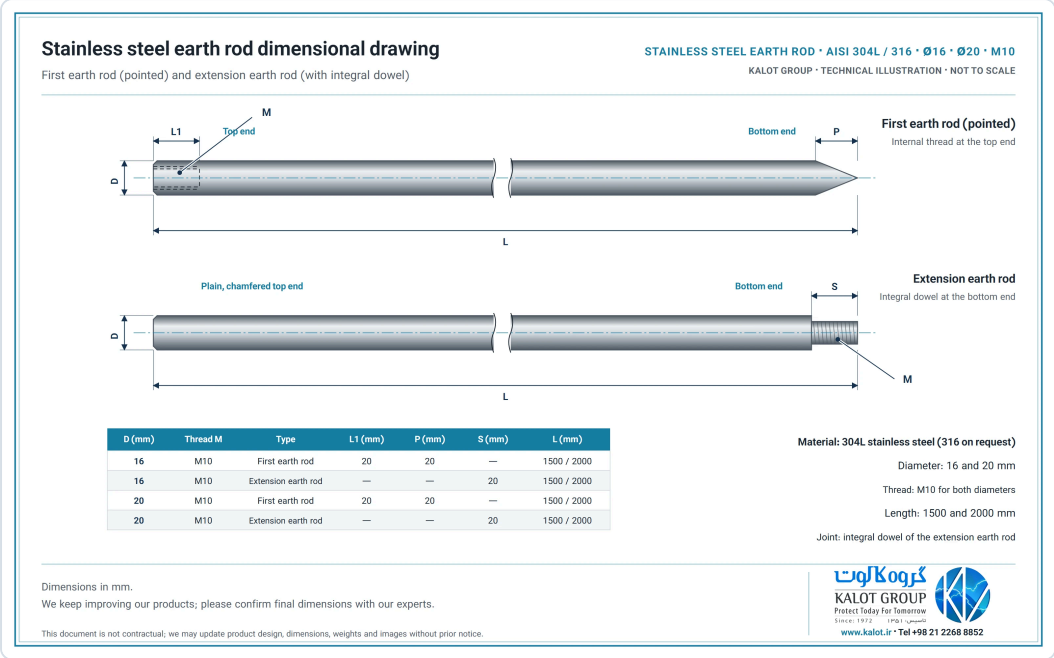
The starter earth rod is pointed (tip length P = 20 mm) and has an M10 internal thread L1 = 20 mm deep at the top end; the extension earth rod has an integral M10 dowel S = 20 mm long at the bottom end, and its top end is plain and chamfered. L is the overall length on both types. Grade 304L is the main grade; for grade 316 the suffix “-316” is added to the code (for example SSER 1615 S-316). We keep improving our products; please confirm final dimensions with our specialists before you buy.

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Structure: first earth rod and extension earth rod

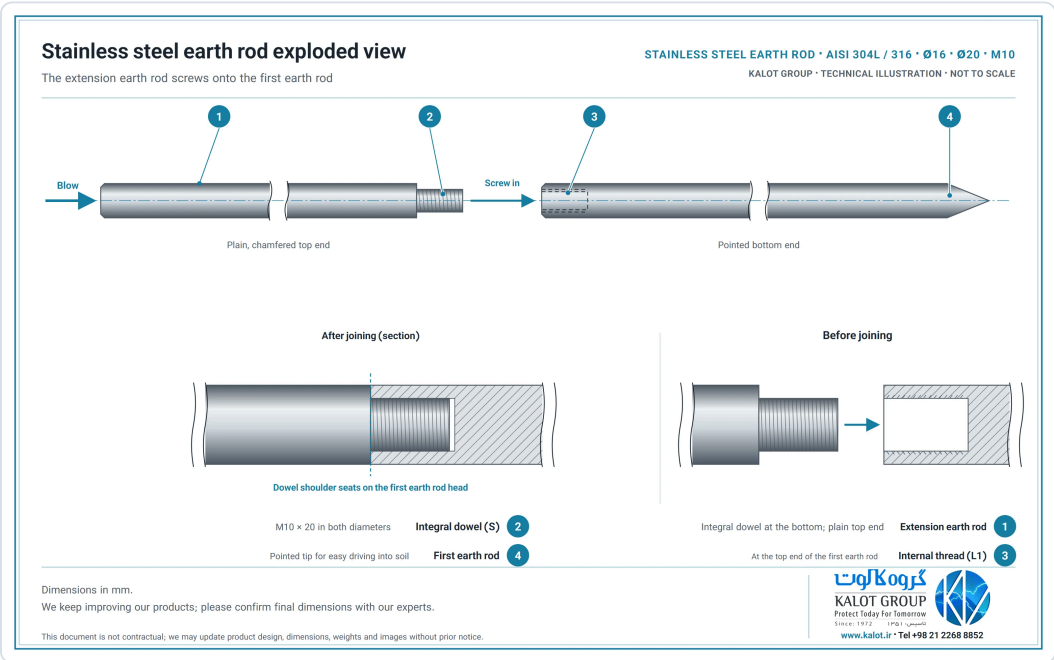
The KALOT stainless steel earth rod comes in two types. The starter earth rod has a pointed bottom end that opens the way through the soil, and an M10 internal thread machined into its top end; during driving, a threaded driving head is screwed into this thread. The extension earth rod has an integral M10 dowel at its bottom end that screws fully into the thread of the starter earth rod until its shoulder seats on the starter rod's top; its top end is plain and chamfered and is driven directly. The dowel is made from the earth rod itself, so there is no separate part in the joint.

Dimensional drawing



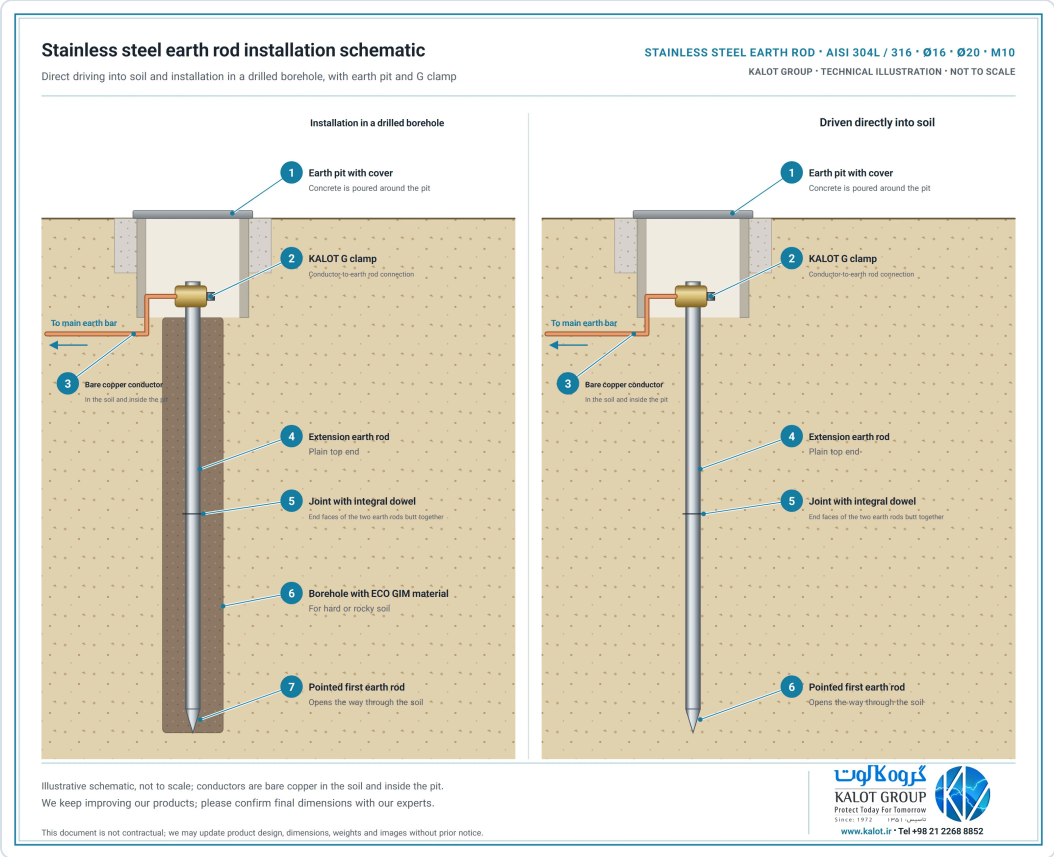
The full print-quality version of this drawing (PDF) can be downloaded from the product page at www.kalot.ir.

Exploded view



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Installation schematic: driven or in a borehole



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How to install and drive the stainless steel earth rod

١. Check the soil resistivity and the electrode location and mark the routes of underground services; dig the hole for the earth pit.

٢. Screw the threaded driving head into the top thread of the starter earth rod and stand the earth rod upright with its point facing down.

٣. With a sledgehammer or electric hammer, strike with even, axial blows until a short part of the earth rod remains above ground; if it leans, stop and straighten it.

۴. Remove the driving head and, by hand and with a clean thread, screw the integral dowel of the extension earth rod fully into the internal thread of the first earth rod until its shoulder seats on the top of the first earth rod.

۵. Drive the extension earth rod directly on its plain upper end until its top sits inside the earth pit; we supply a hollow driving cap in hardened steel on request.

۶. In rocky soil you can drill a borehole, set two coupled lengths in its centre and fill around them with ECO GIM ground improvement material.

٧. Measure the resistance of the electrode; if it is above the required value, drive another electrode at a spacing at least equal to the electrode length.

٨. Inside the earth pit, fix the copper conductor to the top of the earth rod with a KALOT G clamp (conductor) or KALOT A clamp (tape), set the pit in place and pour concrete around it.

Measurement and inspection

Measure the electrode resistance by the fall-of-potential method (62 percent); in systems with several interconnected electrodes, a clamp-on tester is also used. Record the result with the season and soil moisture, and during periodic inspections inside the pit check the clamp tightness and the condition of the conductor. For the measurement method, see How earth termination resistance

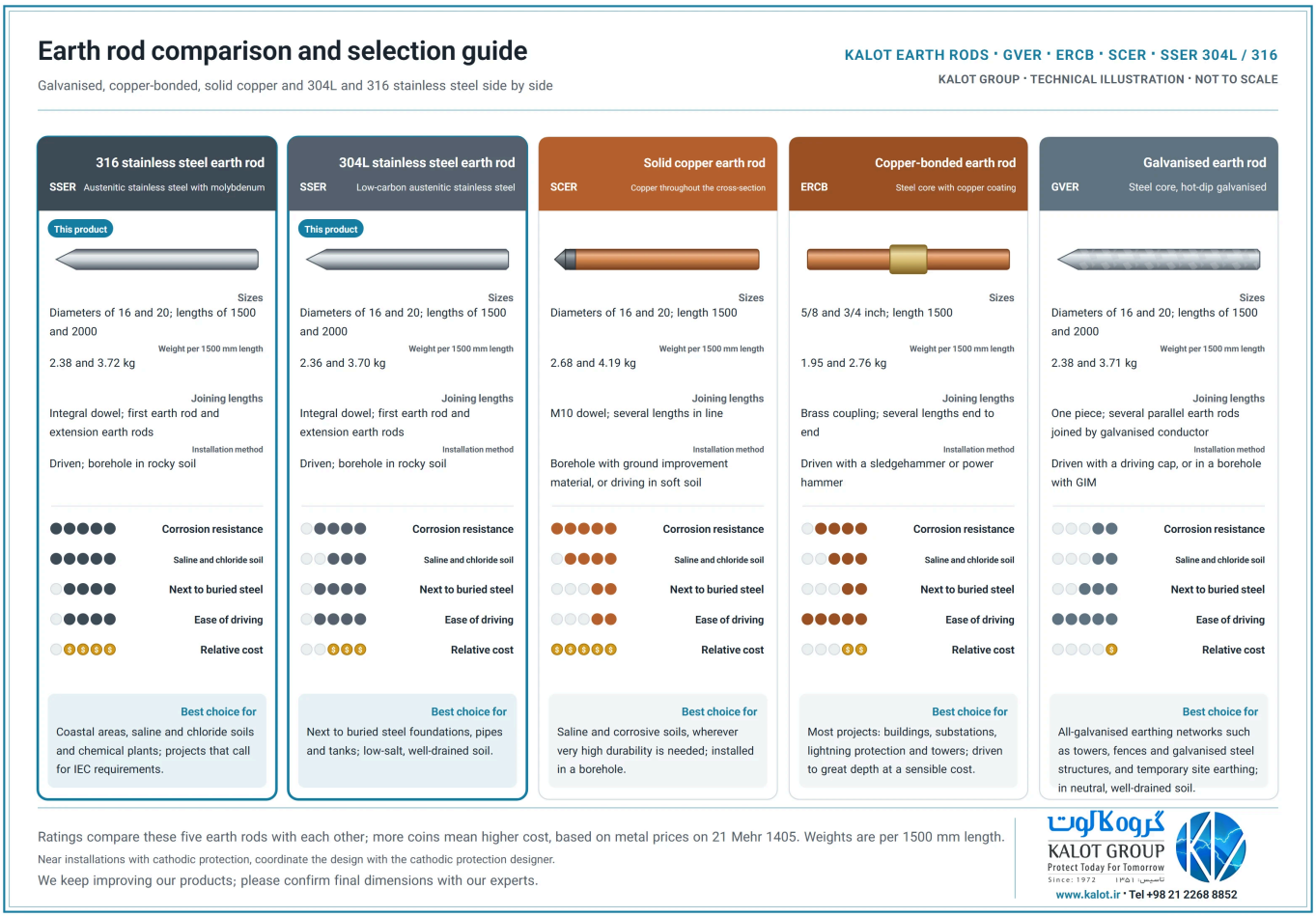
Technical and financial comparison table of KALOT earth rods

Feature	Galvanised	Copper-bonded	Solid copper	Stainless steel 304L	Stainless steel 316
Material	S275 steel core with hot-dip galvanised coating (50 to 70 microns)	Steel core with copper coating (at least 0.25 mm)	Copper throughout the cross-section	Low-carbon austenitic stainless steel (18% chromium, 8% nickel)	Austenitic stainless steel with molybdenum (10% nickel, 2% molybdenum)
KALOT sizes	Diameters of 16 and 20; lengths of 1500 and 2000	5/8 and 3/4 inch; length 1500	Diameters of 16 and 20; length 1500	Diameters of 16 and 20; lengths of 1500 and 2000	Diameters of 16 and 20; lengths of 1500 and 2000
Weight per 1500 length (kg)	2.38 and 3.71	1.95 and 2.76	2.68 and 4.19	2.36 and 3.70	2.38 and 3.72
Joining lengths	One piece, no thread; several parallel earth rods with a galvanised conductor	Brass coupling; several lengths end to end	earth rod dowel M10; several lengths in line	Integral dowel; first earth rod and extension earth rods	Integral dowel; first earth rod and extension earth rods
Installation method	Direct driving with a driving cap, or a borehole with ground improvement material	Driving to great depth	Borehole with ground improvement material, or driving in soft soil	Driving; in rocky soil, a borehole with ground improvement material	Driving; in rocky soil, a borehole with ground improvement material
minimum diameter per IEC 62305-3 (mm)	14	14 (with 0.25 mm coating)	15	15	15
tensile strength per IEC 62561-2:2018 (N/mm²)	350 to 770	350 to 770	200 to 450	350 to 770	350 to 770
maximum electrical resistivity per IEC 62561-2:2018 (μΩ·m)	0.25	0.25	0.018	0.80	0.80
Corrosion resistance	Moderate; the zinc coating is gradually consumed	Good, as long as the coating is intact	Very good	Good	Very good
Saline and chloride soil	Poor to moderate	Medium	Good	Moderate; pitting corrosion is possible	Very good
Acidic and organic soil	Poor	Medium	Medium	Good	Good
Beside buried steel and cathodic protection	Compatible, with faster consumption of the zinc coating; not when connected to foundation reinforcing bars	With caution	With caution	More suitable than copper; in coordination with the designer	More suitable than copper; in coordination with the designer
Ease of driving	Very good	Very good	Limited	Good	Good
Raw metal value per 1500 length (US dollars)	1.2 and 1.8	3.0 and 3.8	39.7 and 62.1	5.2 and 8.1	10.3 and 16.1
Metal value index (copper-bonded = 1)	0.4 to 0.5	1	13 to 16	1.7 to 2.1	3.4 to 4.2
Cost rank (1 = lowest)	1	2	5	3	4
Recommended use	All-galvanised earthing networks: towers, fences and galvanised steel structures; temporary site earthing; neutral, well-drained soil	Most projects: buildings, substations, lightning protection and towers	Saline and corrosive soils; high fault current	Beside foundations and steel pipes and tanks; low-salt, well-drained soil	Coastal areas, chloride soil, chemical industries; projects that call for IEC requirements

This table was prepared on 21 Mehr 1405. The metal value is calculated from the official London Metal Exchange (LME) prices for copper, nickel and zinc and global market reference prices for steel, chromium and molybdenum on the same days, and from the weight of each length; it changes as metal prices change. The selling price also includes manufacturing cost. Weights are for the smaller and larger size of each type. Earth resistance is set by the soil and the electrode length, not by its material; choose the material based on the soil, the surrounding metal structures and the installation method. To learn more, see Choosing the right material for an earth electrode and Calculating earth termination resistance.

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Comparison and selection guide



The full print-quality version of this drawing (PDF) can be downloaded from the product page at www.kalot.ir.

Selection and enquiries

To request a price for the stainless steel earth rod, send our specialists the order code or the diameter (16 or 20 mm), length (1500 or 2000 mm), number of first and extension earth rods, grade (304L or 316) and the accessories you need (driving head, cap, clamp and earth pit). Our specialists at KALOT Group will help you choose the right grade and size for your project.